PROCEEDINGS OF THE SEVENTH NMFS NATIONAL STOCK ASSESSMENT WORKSHOP

(Re)building Sustainable Fisheries and Marine Ecosystems

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TOPIC 2: CONSIDERATIONS FOR STOCK REBUILDING

Discussion Leaders & Rapporteurs: ***Alec MacCall (SWFSC) and Russell Brown (NEFSC)***

Suggested trigger questions*:*

1. Have stock rebuilding plans been successful: stock rebuilding in theory and in practice (including reports from each of the science centers)?
2. How can we incorporate multispecies and ecosystem considerations into stock rebuilding plans?

3. How have economic considerations been incorporated into stock rebuilding plans?
4. Can we develop alternative rebuilding strategies in data-poor situations?

Selection of Rebuilding Strategies and Consideration of Consequences

Most rebuilding plans have considered a range of rebuilding probabilities ranging from 50% up to a 70 or 80% chance of reaching the rebuilding target in the allowable time frame. Managers should establish desired levels of precaution and acceptable levels of risk in advance of stock- or fishery-specific decisions. Faster rebuilding provides a lower risk of recruitment collapse and possible ecosystem benefits by allowing less time for ecological restructuring. More prolonged rebuilding schedules provide less economic disruption (see following). The Sustainable Fisheries Act (SFA) preferred rebuilding time limit of 10 years does not allow for adequate consideration of risks and benefits.

There needs to be closer alignment between rebuilding plans and economic consequences. This issue involves both extremes of polices that are too strong and policies that are too weak. In both cases, management should plan strategically for biological, economic, and technological extraction patterns during rebuilding that tend to match or naturally accommodate corresponding patterns for the rebuilt resource. When policies are too strong, economic and social damage can result from unemployment and industrial collapse, with loss of the infrastructure that will be needed for a rebuilt fishery. When rebuilding policies are too weak, resumption of an economically healthy fishery is delayed, and excess capacity or suboptimal technologies may continue to pose management problems. NOAA Fisheries should consider policies that establish clear consequences for failure to rebuild within prescribed rebuilding periods (but those policies must also recognize that success is expressed as a probability rather than as a certainty).

Rebuilding Accountability

It is still too early to tell (the longest rebuilding programs under the SFA are only two years old), but the group voiced a concern that the effectiveness of the rebuilding programs in some cases is not being monitored adequately. Rebuilding plans should incorporate a cumulative accounting of catches, so that if catches exceed the rebuilding allowance in one year, following years' catch levels are reduced. Progress in rebuilding should be compared with the fishery simulations used to develop the plan, and discrepancies should be reconciled for the purpose of making mid-course corrections

What happens when estimates of reference points change?

Reference points can change due to a variety of reasons, and rebuilding targets and catch policies should be "frameworked" based on general biomass and fishing mortality parameters. Not only does this help to avoid a tedious plan amendment process, but also it makes the rebuilding plan more adaptable to future changes in fishery behavior.

Biomass targets should be estimated with associated confidence intervals, and once established should not be changed unless new estimates are appropriately reviewed and fall outside a pre-determined range in the existing confidence interval. Rebuilding catch rates are especially sensitive to changes in selectivity associated with changes in fleets and gears, especially when immature fish are taken. Use of a specified fishing rate (or even worse, a specified catch level) should be avoided in favor of a more flexible formula that accounts for changes in selectivity. Two possible metrics were proposed. One would be to specify a reference fishing rate in terms of a knife-edge selectivity at the age of maximum cohort productivity, and require that the effect of alternative selectivity patterns be accounted for. Another approach would be to specify an equilibrium value of spawning potential per recruit (SPR) so that any particular selectivity curve would have an associated fishing rate to achieve that SPR.

It is notable that the two separate breakout groups discussing the same issue differed strongly on the desirability of changing reference points in the course of rebuilding. The two points of view seemed to reflect different types of concerns in different regions of the country. At the risk of oversimplifying, scientists from regions with highly variable fish production (west coast) or variable selectivity patterns (Gulf coast) expressed a need for flexible rebuilding plans, whereas scientists from regions with perhaps more predictable fisheries but a history of political manipulation (east coast) preferred a more rigid approach.

Comments (of uncertain veracity) were heard that some Councils may have avoided the problem of shifting reference points by not updating the stock assessments. Rebuilding policies at the Council and at NMFS levels should be crafted so that there is a motivation to update stock assessments and a penalty for not doing so (i.e., a carrot-and-stick approach).

Specification of rebuilding targets: What happens once we "rebuild"?

Many stock rebuilding targets are based on aggregate biomass levels and do not specify the size structure or age structure of a rebuilt population. Consequently, one large yearclass could in some cases satisfy the rebuilding criteria even though the risk of re-entering a depleted condition is quite high. The group recommended that the rebuilding criteria should specify a target reproductive potential (in spawning biomass, or better yet, total egg production) rather than a simple target biomass. Alternatively, distributive properties of the size or age composition could be specified to assure that stock reproductive potential is adequately accounted for. Also, use of simulations to investigate post-rebuilding scenarios would help evaluate both rebuilding criteria and appropriate post-rebuilding management policies.